

EXHIBIT 1

**UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION**

WSOU INVESTMENTS, LLC D/B/A
BRAZOS LICENSING AND DEVELOPMENT,

Plaintiff,

v.

JUNIPER NETWORKS, INC.,

Defendant.

Nos. 6:20-cv-00812-ADA
6:20-cv-00813-ADA
6:20-cv-00814-ADA
6:20-cv-00815-ADA
6:20-cv-00902-ADA
6:20-cv-00903-ADA

JURY TRIAL DEMANDED

DECLARATION OF SCOTT NETTLES, PH.D.

I, Scott M. Nettles, hereby declare and state as follows:

I. Introduction

1. My name is Scott M. Nettles, and I reside at 536 Liberty Street, San Francisco, California 94114. I am submitting this declaration on behalf of WSOU Investments, LLC d/b/a Brazos Licensing and Development (“Brazos”) in the litigations identified on the foregoing page.

2. I understand that Brazos has accused Juniper Networks, Inc. (“Juniper”) of infringing certain claims of Brazos’s patents including U.S. Patent Nos. 7,518,990 (the “’990 patent”) and 7,596,140 (the “’140 patent”) (collectively, the “Asserted Patents”). I am over eighteen years of age and I would be competent to testify as to the matters set forth herein if I am called upon to do so. I am being compensated for my work in this litigation, including the drafting of this expert declaration, at my usual consulting rate of \$550 an hour. My compensation does not depend in any way on the opinions that I express in this declaration, any additional opinions I may submit, or on the outcome of this litigation.

3. I am a technical expert in the subject matter areas relevant to the asserted patents, including computer networking, network traffic management, communication protocols, information storage and transfer, user interfaces, information signal processing, and electronic device control. I am qualified to reach the opinions and conclusions stated in this declaration.

4. I have been asked to consider how one of ordinary skill in the art to which the Asserted Patents are directed would have understood (at the time of invention) the terms identified below. This declaration summarizes my opinions regarding the meanings of the terms addressed herein.

5. I understand that further expert discovery will occur at a later stage in this case, including the submission of expert reports on the infringement and validity of the asserted patents. I reserve my right to update my opinions in this declaration regarding the meaning of

the claims of the asserted patents through any further expert reports and/or testimony that I may provide in this case.

II. Background and Qualifications

6. I have attached a current copy of my curriculum vitae as Exhibit A. A list of the cases during at least the last five years in which I have signed a Protective Order, have testified as an expert either at a trial, hearing, or deposition, or have submitted statements/opinions is included in my CV.

7. I attended Michigan State University from 1977 to 1981 as a Merit Scholar and an Alumni Distinguished Scholar and received a bachelor's degree in Chemistry. I later attended Carnegie Mellon University from 1988 to 1995, during which time I received both a master's degree (1992) and a Ph.D. (1996) in Computer Science. Most of my graduate work was focused on developing programming languages for distributed systems. My dissertation was entitled "Safe and Efficient Persistent Heaps" and focused on high performance automatic storage management for advanced distributed database systems.

8. Before earning my Ph.D., I worked for over four years in industry at Silicon Solutions, Inc. and Digital Equipment Corporation, developing computer aided design (CAD) software for the semiconductor and computer sectors. For example, I designed and implemented systems for VLSI mask generation and VLSI design rule checking. I also built the first graphical drawing editor for the X window system, Artemis, which included a sophisticated graphical user interface.

9. I have worked as a professor at three universities since 1995: the University of Pennsylvania, the University of Arizona, and the University of Texas at Austin. I was the recipient of a National Science Foundation CAREER award for "CAREER: Advancing Experimental Computer Science in Storage Management and Education" while I was an

Assistant Professor at the University of Pennsylvania. During this time, I also was part of the DARPA funded SwitchWare project, which was one of the pioneering groups in the area of Active Networking (“AN”). My group developed PLAN, the first domain-specific programming language for programmable packets, as well as PLANet, the first purely active inter-network.

10. I joined the faculty of the University of Texas at Austin (“UT”), in the Department of Electrical and Computer Engineering in 1999. In 2005, I was appointed Associate Professor with tenure. At UT, my graduate teaching focused on networking, including numerous advanced seminars on mobile and wireless networking. My undergraduate teaching included networking, operating systems, and one of UT’s required programming class, which focused on programming with abstractions, Java, and data structures.

11. At UT, I continued to develop AN technology and, in 2002, my Ph.D. student Mike Hicks won the ACM SIGPLAN dissertation award for our joint work on software updating. Along with my Ph.D. student Seong-kyu Song I focused my AN work on mobile and wireless networking. As a result, my research shifted away from AN to mobile and wireless networking in general, especially interactions between the network, the radios, and the physical world. My most recent research at UT involved the development of Hydra, which is a working prototype of an advanced software-implemented WiFi network funded primarily by NSF.

12. I retired from UT Austin in the Spring of 2013. I am currently self-employed. Much of my current work involves consultations with attorneys regarding questions of patent infringement and validity.

III. The Person of Ordinary Skill in The Art

13. I understand that a patent’s disclosure and claims are viewed and interpreted based on the knowledge and understanding of a person of ordinary skill in the relevant art at the time of the invention.

14. I understand that claims are construed from the perspective of one of ordinary skill in the art to which the patented subject matter pertains at the time of the invention.

Furthermore, I understand that a determination of the level of ordinary skill in the art includes as relevant factors (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) the prior solutions to those problems; (4) the rapidity with which innovations are made in the art; (5) the sophistication of the technology in the art; and (6) the educational level of active workers in the field.

15. My opinion of the level of ordinary skill in the art with regard to the Asserted Patents is instructed by my prior experience working and teaching in the areas of Operating Systems and Computer Networks and my knowledge of colleagues and others working in that general field as of and for many years prior to the 2002/2003 time frame.

16. Taking the above factors into account, in my opinion a person of ordinary skill in the art would be represented by a person with a computer science, electrical engineering, or computer engineering degree and two or more years of professional experience designing and implementing computer networks and/or computer network software. I exceeded that level of skill in the relevant time frame. In addition to being (at least) a POSITA at the time of the invention, as an engineering professor, I taught hundreds of students from 1995–2013 who would meet these qualifications.

IV. Legal Standards

17. I have been instructed by counsel that claim construction is for the Court to decide as a matter of law. Claim terms should be given their ordinary and customary meaning within the context of the patent in which the terms are used, *i.e.*, the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention in light of what the patent teaches.

18. I understand that, in construing a claim term, one looks primarily to the intrinsic patent evidence. I understand that extrinsic evidence may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

19. I understand that the usual and customary meaning of a claim term can be altered by the patent applicant if they choose to act as their own “lexicographer” and clearly set forth in the patent a different meaning for a claim term.

20. I understand that the meaning of a claim term can also be altered during the patent examination process by statements the patent applicant makes about the meaning or scope of the term, and that such statements are recorded in the prosecution history of the application.

21. I understand that if a claim term is ambiguous or unclear, the term must be construed to determine how a person of ordinary skill in the art would have resolved the ambiguity in light of the rest of the patent specification, patent claims, and the application’s prosecution history.

22. I understand that a claim is indefinite if it, having been read in light of the intrinsic evidence, it does not inform one of skill in the art at the time of the invention about the scope of the invention with reasonable certainty.

V. Materials Considered

23. I have considered the following materials in preparing the opinions set forth in this declaration:

- the Asserted Patents, including the specifications and claims;
- the prosecution histories of the Asserted Patent in the United States Patent & Trademark Office (“the PTO”); and
- the extrinsic evidence identified by the parties in their March 15, 2021 disclosures.

24. I also relied on my own training, knowledge, and experience in fields to which the asserted patents are directed, along with my understanding of how one of ordinary skill in the art would have understood the disclosure of the asserted patents.

VI. The '990 Patent

25. I have reviewed the '990 patent and its prosecution history. The inventions of the '990 patent further improve techniques of determining routes for virtually-concatenated data traffic to limit traffic impact or facilitate traffic restoration in the event of route failure. *See, e.g.*, '990 patent at 1:8–12, 2:24–29.

26. I have been asked to opine on whether the terms “routing algorithm determines the routes in a manner that ensures that failure of a single link in the network does not affect more than a designated maximum amount *X* of a bandwidth *B* of the traffic demand,” as used in claims 1, 17, and 18, and “routing algorithm determines the routes in a manner that ensures that failure of a single link in the network affects a minimum amount of a bandwidth *B* of the traffic demand,” as used in claim 6, are indefinite. They are not. My understanding is that Juniper contends the recitation of “minimum” and “maximum” in these claim terms renders them indefinite. However, the meaning of these “algorithm” terms is clear to a person of ordinary skill in the art and these terms are used consistently with that understanding in both the claims and specification of the '990 patent.

27. The specification discusses an exemplary embodiment of a routing algorithm “ α ” that ensures “a single node or link failure does not affect *more than a designated [maximum] amount X* of the total bandwidth,” which may be needed “when traffic is provisioned for a peak rate but a service provider needs to ensure than an average rate, such as 30% below the peak rate, is maintained even after such failures,” '990 patent at 7:20, 7:3–10 (emphasis added); *see also id.* at FIG. 2:

Routing algorithm α takes as input a network representation $G(V, E)$, which generally denotes a graph G comprising a set of vertices V interconnected by edges E . The vertices and edges are also referred to herein as nodes and links, respectively. *The input also includes a traffic demand D , illustratively referred to as a “new” demand, for an amount of bandwidth B , and **a maximum amount of bandwidth X that may be impacted on failure**. The routing problem addressed by algorithm α may be characterized as routing the demand D in G such that a single link failure does not affect more than **the designated maximum amount X** .* The output of algorithm α is a set of routes for members of the VCG carrying the demand D .

Id. at 7:31–43 (emphasis added). This explanation uses the phrase “designated maximum amount” to refer to the bandwidth that may be impacted by the failure of a single link in the same way that the phrase is used in claims 1, 17, and 18. It would be clear to a person of ordinary skill in the art from the claims and the specification that this phrase refers to an input to the routing algorithm. A person of ordinary skill in the art would have no difficulty understanding how to program a routing algorithm to use such an input and would have no difficulty determining whether a routing algorithm uses such an input in the manner claimed.

28. As mentioned above, a person of ordinary skill in the art would be familiar with how to program and use a routing algorithm that makes use of an input “designated maximum amount of bandwidth X that may be impacted on failure” of a single node or link. The specification teaches a person of ordinary skill exactly how a routing algorithm can use such an input:

... Algorithm α initially lets STS-Fc and STS-Yc be the smallest SONET frame rates that can carry [bandwidth] B and **[maximum amount of bandwidth that may be impacted on failure] X** , respectively. This allows F and Y to be determined from B and X , respectively. For each of the edges in E , algorithm α sets the corresponding capacity either to N units of flow, identified by determining the highest SONET rate STS-Nc that can be carried by the edge, or to Y units of flow, whichever is the smaller of the two. Thus, all link capacities in G reflect the largest SONET rate that can be carried and are restricted to a maximum of Y units. *Then,*

algorithm α finds a minimum-cost feasible flow of F units of flow in the graph G. In other words, algorithm α determines an appropriate routing for F units of flow through the graph G.

Any type of conventional flow routing algorithm may be used to determine the feasible flow for F units of flow in the graph G.

For example, path augmentation based maximum flow algorithms may be used, such as those described in L. R. Ford, Jr., “Flows in Network.” Princeton University Press, 1962, and J. Edmonds and R. M. Karp, “Theoretical Improvements in Algorithmic Efficiency for Network Flow Problems,” Journal of ACM, Vol. 19, No.2, 1990, both of which are incorporated by reference herein. Since the requirement is only to route F units of flow, these flow routing algorithms can be stopped once the sufficient flow is routed.

In any given network, there may be various distinct solutions for routing F units of flow, and thus algorithm α determines the minimum-cost [feasible flow] solution. Such minimum-cost feasible flow solutions can be computed using conventional minimum-cost flow algorithms. Exemplary minimum-cost-flow algorithms are described in R.K. Ahuja et al., “Network Flows: Theory, Algorithms, and Applications,” Prentice Hall, 1993, J.B. Orlin, “A Faster Strongly Polynomial Minimum Cost Flow Algorithm,” Proc. of the 20th ACM Symposium on the Theory of Computing, pp.377–387, 1988, and W. S. Jewell, “Optical Flow through Networks,” Interim Technical Report 8, Operations Research Center, MIT, Cambridge, Mass., all of which are incorporated by reference herein.

The determined minimum-cost feasible flow identifies the set of routes for members of the VCG carrying the demand D. More specifically, once F units of flow are routed through G, F paths of unit flow may be extracted and each path may then be used to route a VCG member made up of an STS-1 circuit.

Id. at 7:44–8:19 (emphasis added); *see also id.* at FIG. 2. Based on this, a person of ordinary skill in the art would understand that the routing algorithm could use a “conventional flow routing algorithm” to find “a minimum-cost feasible flow of F units” ensures that failure of a link does not affect more than the input designated maximum amount X of the total bandwidth B of a traffic demand. For example, as in Scenario A described by the patent, “a particular gigabit (Gb) Ethernet service” could be “provisioned for a peak rate” and a designated maximum of traffic that can be impacted by a failure could be input to ensure that even after a failure the average

traffic rate does not fall below 30% below the peak rate (*i.e.*, the maximum bandwidth that could be impacted by a failure would be 30% the peak rate). *See id.* at 7:3–10. In such a case, a person of ordinary skill in the art would understand based on the patent that the routing algorithm would use a “convention flow routing algorithm” to calculate “a minimum-cost feasible flow of F units of flow” necessary to ensure that no more than 30% of the traffic demand is impacted by the failure, as required by the input “designated maximum amount X.”

29. A person of ordinary skill in the art would have been familiar with “conventional flow routing algorithms” that could be used for this purpose. The specification of the ’990 patent incorporates several references, dating back to as early as 1962, demonstrating that a number of algorithms were well-known in the art that can be utilized to ensure that the failure of a single link does not affect more than a maximum amount of bandwidth of the traffic demand. ’990 patent at 7:57–65 (citing L. R. Ford, Jr. et al., *Flows in Network* (1962) (WSOU-Juniper-0003133); Jack Edmonds et al., *Theoretical Improvements in Algorithmic Efficiency for Network Flow Problems*, 19 J. ACM 248 (Apr. 1972) (WSOU-Juniper-0003578)), 8:1–13 (citing Ravindra K. Ahuja et al., *Network Flows: Theory, Algorithms, and Applications* (1993) (WSOU-Juniper-0004035 at WSOU-Juniper-0004217–504)).

30. *Introduction to Algorithms* by Thomas H. Cormen et al., is another reference that shows that persons of ordinary skill in the art would have been familiar with algorithms that use designated maximum amounts of bandwidth that may be impacted by a link failure. This is an industry standard and widely known text that I’ve used over the years in my role as a professor.¹

¹ Versions of this reference have been cited over 10,000 times, CiteSeerX, *Citation Query: Introduction to Algorithms*, <http://citeseerx.ist.psu.edu/showciting?cid=1910> (last access March 12, 2021) (WSOU-Juniper-0003113), and has “become the standard text in the field, selling half a million copies in 20 years,” Larry Hardesty, *Milestone for MIT Press’s Bestseller*, MIT News (Aug. 10, 2011), available at <https://news.mit.edu/2011/introduction-to-algorithms-500k-0810>

See Thomas H. Cormen et al., *Introduction to Algorithms* (2d ed. 2001) (WSOU-Juniper-0004932). *Introduction to Algorithms* teaches several algorithms that could be utilized to route virtually-concatenated traffic such that the failure of a single link does not affect more than a designated maximum amount of bandwidth, such as the Ford-Fulkerson Algorithm, the Edmonds-Karp Algorithm, and the Minimum-Cost Flow Algorithm. See *id.* at WSOU-Juniper-0005485–5497 and WSOU-Juniper-0005618–5621.

31. Regarding the term, “routing algorithm determines the routes in a manner that ensures that failure of a single link in the network affects a minimum amount of a bandwidth B of the traffic demand,” the specification also discloses an exemplary embodiment of a routing algorithm “ β ” which ensures “that a single node or link [failure] *affects the **minimum bandwidth.***” ’990 patent at 9:4; 7:11–12 (emphasis added).

... This scenario is similar to scenario A except that *the requirement is to minimize the extent of damage on failure*. In a network with complete route diversity, all of the flows are routed on disjoint paths such that any failure will affect only a single unit flow. At the other extreme, in a network with no route diversity, all of the flows are carried on one route, and a failure will affect all of the flows. Therefore, the problem of minimizing the damage on failure may be generally viewed as finding a solution in between these two extremes. As will be described below, algorithm β achieves this objective in an effective manner.

Routing algorithm β takes as input a network representation $G(V, E)$, and a traffic demand D for an amount of bandwidth B .

(WSOU-Juniper-0003938). With reference to certain other algorithms known as “red black trees,” it has been referred to as the “only one widely accepted resource ... affectionately known as CLR.” Julianne Walker, *Red Black Tree Tutorial*, Eternally Confuzzled http://www.eternallyconfuzzled.com/tuts/datastructures/jsw_tut_rbtree.aspx, available at https://web.archive.org/web/20141129024312/http://www.eternallyconfuzzled.com/tuts/datastructures/jsw_tut_rbtree.aspx (last accessed March 12, 2021) (WSOU-Juniper-0003115). One collection of “Scholarly Resources for CompSci Undergrads” states that this reference “covers a lot of territory and covers it well.” J. Bluestein, *Scholarly Resources for CompSci Undergrads*, <http://web.cs.dal.ca/~jamie/UWO/.Refs/tech-books.html> (last accessed March 12, 2021) (WSOU-Juniper-0003943).

The routing problem addressed by algorithm β may be characterized as routing the demand D in G such that a single link failure affects the minimum amount of traffic. The output of algorithm β is a set of routes for members of the VCG carrying the demand D .

The operation of algorithm β is as follows. Algorithm β initially lets STS- F_c be the smallest SONET frame rate that can carry B . Once F is determined from B in this manner, algorithm β chooses a value of Y , representing damage on failure, by doing a binary search between 1 and F . For each value of Y , algorithm β first alters the link capacities as in algorithm α and then attempts to route the flow of F units in G . For each value of Y , algorithm β attempts to find a solution, if such a solution exists, where bandwidth B can be routed such that no link failure will affect more than an STS- Y_c amount of bandwidth, again assuming that VCG members comprise STS-1 circuits. The smallest value of Y for which F units of flow can be routed in G is the best solution.

'990 patent at 9:4–35 (emphasis added); *see also id.* at FIG. 3. This explanation uses the phrase “affects the minimum amount” to refer to the problem addressed by routing algorithm β in the same way that the phrase “affects a minimum amount” is used in claim 6. A person of ordinary skill in the art would have had no difficulty understanding how to program a routing algorithm to solve such a problem by minimizing the amount of bandwidth affected by the failure of a network link, and would have no difficulty determining whether a routing algorithm accomplishes the goal of solving that problem.

32. As mentioned above, a person of ordinary skill in the art would be familiar with how to program and use a routing algorithm that minimizes the amount of bandwidth affected by the failure of a network link. The specification teaches a person of ordinary skill exactly how a routing algorithm can solve such a problem:

The operation of algorithm β is as follows. Algorithm β initially lets STS- F_c be the smallest SONET frame rate that can carry B . Once F is determined from B in this manner, algorithm β chooses a value of Y , representing damage on failure, by doing a binary search between 1 and F . For each value of Y , algorithm β first alters the link capacities as in algorithm α and then attempts to

route the flow of F units in G . For each value of Y , algorithm β attempts to find a solution, if such a solution exists, where bandwidth B can be routed such that no link failure will affect more than an $STS-Y_c$ amount of bandwidth, again assuming that VCG members comprise $STS-1$ circuits. ***The smallest value of Y for which F units of flow can be routed in G is the best solution.***

'990 patent at 9:23–35 (emphasis added); *see also id.* at FIG. 3. Thus, the specification makes clear that algorithm β may utilize similar minimum-cost flow algorithms as algorithm α but also operates to identify the smallest value of Y , *i.e.*, the value representing the minimum damage on failure, for which the given units of flow (F) can be routed in the network (G). It does so by using the algorithm α discussed above to determine routing sets for multiple values of Y and then attempting to route traffic according to them. By doing so, the algorithm is able to determine the solution that affects the minimum amount of bandwidth, which it identifies as the best solution. A person of ordinary skill in the art would be able to analyze a routing algorithm to determine whether it operates to determine routes in a manner ensuring that failure of a single link in a network affects a minimum amount of bandwidth, as recited in claim 6.

33. Accordingly, based on my independent review of the '990 patent, its prosecution history, and the other materials referenced in this declaration, along with my own experience and expertise. I disagree that the terms “routing algorithm determines the routes in a manner that ensures that failure of a single link in the network affects a minimum amount of a bandwidth B of the traffic demand” and “routing algorithm determines the routes in a manner that ensures that failure of a single link in the network does not affect more than a designated maximum amount X of a bandwidth B of the traffic demand” are indefinite as asserted by Juniper. Algorithms for routing network traffic such that only a minimum amount of traffic is impacted, or such that not more than a designated maximum amount of traffic is impacted were well known in the art. There is nothing unclear about the meaning of the words or phrases in these claim terms and a

person of ordinary skill in the art would have no difficulty understanding the scope of claims 1, 6, 17, and 18 with reasonable certainty.

VII. The '140 Patent

34. I have reviewed the '140 patent and its prosecution history. The inventions of the '140 patent enable network devices to create bi-directional label switched paths. I have been asked to opine on whether the terms “the device,” recited in claims 21–24, 31, and 33, is indefinite. Although this term may lack an antecedent basis in the independent claims, it is my understanding that this does not automatically render the claims indefinite. In my opinion, the scope of these claims is reasonably certain to a person of ordinary skill in the art and they are not indefinite.

35. The term “the device” first appears in independent claim 21 in the phrase “generating and sending an independent backward path request message to a source of a separately generated, initial forward path request message associated with a forward Label Switched Path (LSP) between the device and the source.” '140 patent at 5:51–55.

36. A person of ordinary skill in the art would have been familiar with LSPs. These are referenced in numerous industry standards, such as RFC 3471, which deals with the “Generalized Multi-Protocol Label Switching (GMPLS) Signaling Functional Description.” WSOU-Juniper-004898. A person of ordinary skill in the art would have known that an LSP is a path that traffic flows along in a network between two “nodes.” For example, RFC 3471 describes that “the term ‘initiator’ is used to refer to a node that starts the establishment of an LSP and the term ‘terminator’ is used to refer to the node that is the target of the LSP.” *Id.* at WSOU-Juniper-0004913. The '140 patent consistently refers to LSPs in a manner consistent with this understanding. For example, it describes “a bi-directional LSP ... between network

device 2 operating as source device and network device 1 operating as a destination device.”
 ’140 patent at 2:23–25; *see also id.* at 3:33–4:13.

37. Accordingly, when claim 21 refers to “a forward Label Switched Path (LSP) between the device and the source,” a person of ordinary skill in the art would understand that the term “the device” necessarily refers to the node at the opposite end of the LSP from “the source.” There would be no confusion to a person of ordinary skill in the art regarding what “the device” refers to in the claims and a person of ordinary skill in the art would have no difficulty determining whether there is “a forward Label Switched Path (LSP) between the device and the source,” as recited in claim 21. Therefore, in my opinion, the scope of these claims is not indefinite.

VIII. Conclusion

38. I understand that, after I submit my declaration, Juniper will submit a paper further explaining its positions on the meaning of the disputed claim terms. I also understand that, after I submit my declaration, Juniper may submit declarations of their own expert concerning the meaning of the disputed claim terms. I therefore reserve my right to take into account and to address Juniper’s and its expert’s positions at that time.

39. I reserve the right to supplement or amend my opinions in response to opinions expressed or positions taken by Juniper’s experts, or in light of any additional evidence, testimony, discovery, or other information that may be provided to me after the date of this declaration. In addition, I reserve the right to consider and testify about issues that may be raised by Juniper’s fact witnesses and experts at any hearing or in any expert reports. I also reserve the right to modify or to supplement my opinions as a result of ongoing fact and expert discovery or testimony at trial.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 29, 2021,

Scott M. Nettles Ph.D.

Scott M. Nettles, Ph.D.

EXHIBIT A

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San Francisco, CA 94114

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Email: Scott.M.Nettles@gmail.com

Research Interests

Experimental computer science and engineering. Networking, operating, and transaction systems. Programming languages. Wireless and mobile networking. Design and implementation of wireless node prototypes. Cross-layer network design and implementation. Active networking and mobile code. Memory management and high-performance garbage collection. Persistent storage management.

Education

1988 – 1995, Carnegie Mellon University **Pittsburgh, PA**

Ph.D. in Computer Science, 1996.

Thesis: *Safe and Efficient Persistent Heaps*

Advisor: Jeannette Wing

M.S. in Computer Science, 1992.

1981 – 1984, Department of Chemistry, Stanford University **Palo Alto, CA**

Ph.D. candidate. Research focus - statistical mechanics and computational chemistry.

1977 – 1981, Michigan State University **East Lansing, MI**

B.S. in Chemistry (Honors College), 1981.

Awards

2008 Grand Prize Award for WinCool Wireless Networking Demo Contest WiNTECH Workshop at ACM MobiCom 2008, San Francisco, CA for Hydra demonstration.

2005 Outstanding Faculty Software Engineering Masters Program.

2002 First PhD student, Michael Hicks, winner of the 2002 ACM SIGPLAN Doctoral Dissertation award.

1997 – 2001, NSF CAREER award for “CAREER: Advancing Experimental Computer Science in Storage Management and Education.”

1977 – 1981, Merit Scholar, Alumni Distinguished Scholar, Michigan State University.

Work Experience

May 2013 – Present, **Austin, TX/San Francisco, CA**
Consultant.

June 2013 – May 2015, The University of Texas at Austin **Austin, TX**
Adjunct Associate Professor, Department of Electrical and Computer Engineering.

September 2005 – May 2013, The University of Texas at Austin **Austin, TX**
Associate Professor (with tenure), Department of Electrical and Computer Engineering.

September 1999 – August 2005, The University of Texas at Austin **Austin, TX**
Assistant Professor, Department of Electrical and Computer Engineering.

March 2001 – December 2004 University of Pennsylvania **Philadelphia, PA**
Adjunct Assistant Professor, Department of Computer and Information Science.

Scott M. Nettles

August 1998 – August 1999, The University of Arizona **Tucson, AZ**
 Visiting Assistant Professor, Department of Computer Science.

January 1995 – August 1999, University of Pennsylvania **Philadelphia, PA**
 Assistant Professor, Department of Computer and Information Science.

Summer 1990, DEC Systems Research Center **Palo Alto, CA**
 Wrote formal specification of copying garbage collection in Larch specification language.

September 1988 – December 1994, Carnegie Mellon University **Pittsburgh, PA**
 Research Assistant, School of Computer Science.

May 1985 – August 1988, DEC Western Research Laboratory **Palo Alto, CA**
 Designed and implemented CAD software, including Artemis, a graphics editor, and WCHCK, a well checker for the Magic VLSI layout system.

June 1984 – April 1985, Silicon Solutions, Inc. **Menlo Park, CA**
 Designed and implemented novel algorithms for VLSI mask generation.

Summers 1978, 1979, 1980, 1981, Michigan State University **East Lansing, MI**
 Research Assistant, Department of Chemistry.

Teaching Experience

September 1999 – Present **The University of Texas at Austin**
 Spring 2011:
 EE422C, Data Structures.
 EE382N-5, Communication Networks: Technology/Architecture/Protocols.
 EE372N, Telecommunication Networks.
 Fall 2010:
 EE422C, Data Structures.
 Spring 2010:
 EE322C, Data Structures.
 EE382V, Wireless and Mobile Networking.
 Fall 2009:
 EE322C, Data Structures.
 EE382N-5, Communication Networks: Technology/Architecture/Protocols.
 Spring 2009:
 EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).
 Fall 2008:
 EE322C, Data Structures.
 EE382N-5, Communication Networks: Technology/Architecture/Protocols.
 Summer 2008:
 Group Independent Study - Reading in Wireless and Mobile Networking.
 Spring 2008:
 EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).
 EE382V, Wireless and Mobile Networking.
 Fall 2007:
 EE322C, Data Structures.
 EE382N-5, Communication Networks: Technology/Architecture/Protocols.
 Summer 2007:
 Group Independent Study - Reading in Wireless and Mobile Networking.

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Spring 2007:

EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).

EE382V, Wireless and Mobile Networking.

Fall 2006:

EE322C, Data Structures.

EE382N-5, Communication Networks: Technology/Architecture/Protocols.

Summer 2006:

Group Independent Study - Reading in Wireless and Mobile Networking.

Spring 2006:

EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).

Fall 2005:

EE322C, Data Structures.

EE382N-5, Communication Networks: Technology/Architecture/Protocols.

Summer 2005:

Group Independent Study - Reading in Wireless and Mobile Networking.

Spring 2005:

EE372N, Telecommunication Networks.

EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).

Fall 2004:

EE382N-5, Communication Networks: Technology/Architecture/Protocols.

Summer 2004:

Group Independent Study - Reading in Wireless and Mobile Networking.

Spring 2004:

EE372N, Telecommunication Networks.

EE382N-5, Communication Networks: Technology/Architecture/Protocols (ESE).

EE382V, Advanced Topics in Mobile Networking.

Previously:

9 terms (4 ESE), EE382N-5, Communication Networks: Technology/Architecture/Protocols.

3 terms, EE360P, Operating Systems.

2 terms, EE397K, Advanced Topics in Mobile Networking.

1 term, EE382N, Active and Mobile Networking.

1 term, EE397K, Advanced Topics in Active Networking.

August 1998 – August 1999

The University of Arizona

Spring 1999, CS 425/525, Principles of Computer Networking.

Fall 1998, CS 576, Graduate Introduction to Computer Architecture.

January 1995 – May 1998

University of Pennsylvania

4 terms, CIS 501, Graduate Introduction to Computer Architecture.

1 term, CIS 570, Advanced Programming Language Implementation.

1 term, CSE 385 (Honors), Experimental Computer Science Laboratory.

Fall 1988 – Fall 1994, School of Computer Science

Carnegie Mellon University

Teaching assistant for Analysis of Algorithms and Introduction to Programming Languages.

Fall 1981 – Spring 1984, Department of Chemistry

Stanford University

Teaching assistant for Freshman Chemistry, Physical Chemistry and Advanced

Physical Chemistry Laboratory. Head teaching assistant Freshman Chemistry.

Scott M. Nettles

Fall 1980 – Spring 1981, Department of Chemistry **Michigan State University**
Teaching assistant for Honors Freshman Chemistry.

Fall 1979 – Spring 1980, Lyman Briggs College **Michigan State University**
Head teaching assistant for Introductory APL and Introductory Fortran.

Funding

Past

“NeTS-ProWiN: Practical Use of Channel Information in Multihop Wireless Networks,” 9/06-8/10, NSF, \$725,802, PI: Scott Nettles, Co-PI: Robert Heath

“Cooperative Communication and Architectures for Cross-Layer Coordination,” 6/06-12/06, The Department of Defense (Air Force), \$118,401, PI: Scott Nettles Co-PI: Christine Julien

“NeTS - ProWiN: Collaborative Research: Exploiting Flexible PHYs in Networks: Prototype and Algorithms,” 9/04-8/06, NSF, \$500,000, PI: Scott Nettles, Co-PIs: Jeffrey Andrews, Sanjay Shakkottai, Robert Heath, Gustavo de Veciana, Co-Collaborator: Kapil Dandekar, Drexel University.

“MIMO Ad Hoc Battlefield Networks in Dense Urban Environments,” 6/04-5/05, National Instruments, \$52,500, PI: Robert Heath, Co-PIs: Scott Nettles, Jeff Andrews, Kapil Dandekar (Drexel University).

“ITR: Collaborative Research: Resource Allocation and Denial of Service Prevention in Active Networks,” 9/00-8/04, NSF (CSE-0081360), \$417,746, PI: Scott M. Nettles, Co-PI: Gustavo de Veciana, Co-Collaborator: Jonathan Smith, The University of Pennsylvania.

“CISE Research Instrumentation,” 3/00-2/03, NSF, \$139,481, with Doug Burger, Steve Keckler, Harrick Vin, Inderjit Dhillon, and Tandy Warnow.

“SCOUT: Scientific Computing Cluster of UT,” 8/00-7/01, IBM Shared University Research Grant, \$430,000, with Doug Burger, Steve Keckler, Harrick Vin, Inderjit Dhillon, and Tandy Warnow.

“Accelerating Network Evolution with a Software Switch for Active Networks,” 8/96-7/00, DARPA, \$3,175,688, PI: J. M. Smith, Co-PIs: D. J. Farber, C. A. Gunter, S. M Nettles, D. C. Feldmeier, and W. D. Sincoskie.

“Undergraduate Education in High Performance Computing,” 7/96-6/98, NSF, \$98,955, PI: V. Tannen, Co-PIs: I. Lee, S. Nettles, E. Simoncelli, I. Winston.

“A Storage Management Test-Bed,” 6/97-5/98, Penn Research Foundation, \$8,000, PI: S. Nettles.

“CAREER: Advancing Experimental Computer Science in Storage Management and Education,” 6/97-5/00, NSF, \$205,000, PI: S. Nettles.

“Intel Technology for Education 2000: ENIAC 2000,” 12/97-12/00, Intel, \$1,900.00, PI: David Farber. Note: Although we choose not to have Co-PIs on this grant, I was one of the primary authors.

Scott M. Nettles**Completed PhD Students**

Michael Hicks (“Dynamic Software Updating”, May 2001, University of Pennsylvania. Winner of the 2002 ACM SIGPLAN Doctoral Dissertation Award.) (Currently, Associate Professor, University of Maryland CS, CAREER Award 2004).

Jon Moore (“Practical Programmable Packets”, July 2002, University of Pennsylvania)).

Seong-kyu Song (“Applying Active Network Adaptability to Wireless Networks,” December 2004, The University of Texas at Austin).

Alex Garthwaite (“Making the Trains Run on Time”, December 2004, University of Pennsylvania)).

Minyoung Park (“Designing Medium Access Control Protocols for Multiple-Input Multiple-Output Wireless Networks,” July 2005, The University of Texas at Austin)

Yihong Zhou (“Spatial Usage and Power Control in Multihop Wireless Networks,” December 2006, The University of Texas at Austin)

Soon Hyeok Choi (“A Software Architecture for Cross-Layer Wireless Networks,” May 2008, The University of Texas at Austin)

Wonsoo Kim (“Improving the Performance of Wireless Networks using Frame Aggregation and Rate Adaptation,” December 2010, The University of Texas at Austin)

Ketan Mandke (“Validating Wireless Network Simulations Using Direct Execution,” February 2012, The University of Texas at Austin)

Karen Watkins (“Beam-Enabled Acoustic Link Establishment (BEALE) for Underwater Acoustic Networks, ” April 2013, The University of Texas at Austin)

UT Master’s Students

MS Thesis Completed - Stephen Shannon, Sangyoo Ha, Vijaylaxmi Chakravarty, Anish Jacob, Hari Sankar.

MS Report Completed -

Vivek Kumar, Jay Shah, Manoj Agarwal, Harold Zhu, Divya Madhusudhan, Jaewoo Kim, Chatchawan Dejitthirat, Vijay Hampapur, Tatiana Garban, Diane Flemming, Anant Badrayani, Nikolaus Brauer, Omar Cardona, Edward Doan, Elton Faggett, Jermel Kyon Holman, Vijaya Jas, Adriana Lopez Prieto, Sanjay Mishra, Louis Orenstein, Nicholas Orrick, S. V. N. Vavilikolanu, Madeline Vega.

Former Post Doctoral Fellows

University of Pennsylvania - Luke Hornoff.

Completed Plan II Honors Thesis

Matthew Augustine (Also Senior Project).

Scott M. Nettles

Professional Activities

Technical Program Committee Member-International Working Conference on Active Networks, 2002, 2003, 2004.

Technical Program Committee Member-IEEE Computer and Communication Society (INFOCOM) Conference, 2003.

Member International Federation for Information Processing Working Group 6.7 on Active and Programmable Networks, 2000-Present.

Presentation to, Chief of Naval Operations Strategic Study Group, 2004.

NSF Wireless Networking PI meeting, 2004.

DARPA Application Private Networks workshop, 2003.

DARPA Active Networks Next Generation Workshop, 2001.

Co-Program Chair and Committee Member-International Working Conference on Active Networks, 2001.

DARPA Information Science and Technology Study Group (ISAT) on "Mobility and Security", 2000.

Technical Program Committee Member - International Symposium on Memory Management, 1998, 2000.

Co-organizer of the Seventh International Workshop on Persistent Object Systems. Cape May, New Jersey, June 1996.

NSF grant review panels CISE-CCR (compiler area) (1997), CISE-AINR (Network Area) (2000, 2001, 2003), CISE-NeTS (Network Area) (2004), CISE-SOD (2004)

Reviewer for a variety of conferences and journals, including: ACM Transactions on Programming Languages and Systems, the ACM SIGPLAN Conference on Programming Language Design and Implementation, IEEE Computer and Communication Society (INFOCOM) Conference, ACM SIGPLAN International Conference on Functional Programming, the ACM Symposium on Operating Systems Principles, and others.

Departmental Service

Graduate Admissions Committee, Communications, Networking, and Systems area, 2000-2011.

Computer Engineering Curriculum Committee, 1999-2004.

Communications, Networking, and Systems Curriculum Committee, 1999-2011.

Graduate Admissions Committee, Computer Engineering area, 2000-2002.

Undergraduate Appeals Committee, 2000-2004.

Department Metric Review Committee, 2002.

Scott M. Nettles

Publications and Talks

Books

1. "Proceedings of the Third International Working Conference on Active Networks," Ian W. Marshall, Scott Nettles, and Naoki Wakamiya editors, volume 2207 of Lecture Notes in Computer Science, 164 pages. Springer-Verlag, October 2001.
2. "Proceedings of the Seventh International Workshop on Persistent Object Systems," Richard Connor and Scott Nettles, Ed., 267 pages. *Morgan Kaufmann*, 1997.

Book Chapters

1. "Execution Environments," Scott M. Nettles and Michael Hicks, To appear in Active Networks, Bobby Bhattacharjee and James Sterbenz editors, John Wiley and Sons, U.K., 2004, Book in progress, our chapter is complete.
2. "Realizing SwitchWare," Jonathan M. Smith and Scott M. Nettles, Appears in Programmable IP Networks: Management and Rapid Service Deployment, A. Galis, S. Denazis, C. Klein, and C. Brou editors, Artech House (March 2004), pages 65-86.

Refereed Journal Publications

1. "Using Active Networking's Adaptability in Ad Hoc Routing." Nettles, S.M. and Song, S.K. , In IFIP Lecture Notes in Computer Science (LNCS). Vol. 3912, No. 3912, 138-155, 2011.
2. "Evolution in Action: Using Active Networking to Evolve Network Support for Mobility," Hicks, M. and Nettles, S., Seong-Kyu, S., and Shannon, S. , In IFIP Lecture Notes in Computer Science (LNCS). Vol. 2546, No. 2546, 146-161, 2011.
3. "Active Networking for TCP over Wireless," Nettles, S.M. and Song, S.K., In IFIP Lecture Notes in Computer Science (LNCS). Vol. 3912, No. 3912, 156-168, 2011.
4. "On the architecture of Authentication, Authorisation, and Accounting for real-time secondary market services," Yihong Zhou, Dapeng Wu, and Scott M. Nettles, In International Journal of Wireless and Mobile Computing (IJWMC), Vol. 4, No. 3, 2010
5. "On MAC-Layer Denial of Service Attacks in IEEE 802.11 networks: Analysis and Countermeasures," Yihong Zhou, Dapeng Wu, and Scott M. Nettles, Int. J. Wire. Mob. Comput. 1, 3/4 (Feb. 2006), 268-275.
6. "Dynamic Software Updating," Michael Hicks and Scott Nettles, In *ACM Transactions on Programming Languages and Systems*. 27, 6, (2005) 1049–1096
7. "Active Networking: One View of the Past, Present, and Future," Jonathan M. Smith and Scott Nettles, *IEEE Transactions on Systems, Man, and Cybernetics*, Part C 34(1): 4-18 (2004).
8. "Disk-Covering, a fast converging method for phylogenetic tree reconstruction," D. Huson, S. Nettles, and T. Warnow, *The Journal of Computational Biology*, Special issue for selected papers from RECOMB 1999, Vol. 6, No. 3, 1999, pp. 369-386. (This appeared in a preliminary form in the Proceedings of RECOMB 1999, as Obtaining highly accurate topology estimates of evolutionary trees from very short sequences. Lyon, France.)
9. "The Hybrid tree reconstruction method," D. Huson, S. Nettles, K. Rice, T. Warnow, and S. Yooshep *The Journal of Experimental Algorithmics*, Volume 4, Article 5, 1999. Special issue for selected papers from The Workshop on Algorithms Engineering, Saarbrücken, Germany, 1998. <http://www.jea.acm.org/1999/HusonHybrid/>.

10. "The SwitchWare Active Network Architecture," D. Scott Alexander, William A. Arbaugh, Michael W. Hicks, Pankaj Kakkar, Angelos D. Keromytis, Jonathan T. Moore, Carl A. Gunter, Scott M. Nettles, and Jonathan M. Smith, *IEEE Networking*, Special issue on Active and Controllable Networking, 1998.
11. "Composing First-Class Transactions," Nicholas Haines, Darrell Kindred, J. Gregory Morrisett, Scott M. Nettles, and Jeannette M. Wing, *ACM Transactions on Programming Languages and Systems*, Vol. 16, No. 6, November 1994, Pages 1719-1736.
12. "Solvent Isotope Effects Upon the Kinetics of Some Simple Electrode Reactions," Michael J. Weaver, Paul D. Tyma and Scott M. Nettles, *J. Electroanal. Chem.*, 140(1980).
13. "Solvent Isotope Effects Upon the Thermodynamics of Some Transition-Metal Redox Couples in Aqueous Media," Michael J. Weaver and Scott M. Nettles, *Inorg. Chem.*, 19(1980).

Invited Publications

1. "Chunks in PLAN: Language Support for Programs as Packets," Jonathan T. Moore, Michael Hicks, and Scott M. Nettles, *Proceedings of the 37th Annual Allerton Conference on Communication, Control, and Computing*, September 1999.

Refereed Conference Publications

1. "An Experimental Evaluation of Rate Adaptation for Multi-Antenna Systems," Wonsoo Kim, M. O. Khan, K. T. Truong, Soon-Hyeok Choi, R. Grant, H. K. Wright, K. Mandke, R. Daniels, R. W. Heath, Jr., and S. Nettles Appears in Proc. of the IEEE INFOCOM 2009, April 19-25, 2009, Rio de Janeiro, Brazil, pp. 2313 - 232 (2009).
2. "Improving the performance of multi-hop wireless networks using frame aggregation and broadcast for TCP ACKs," Wonsoo Kim, Hyrum K. Wright, and Scott M. Nettles Appears in CoNEXT '08: Proceedings of the 2008 ACM CoNEXT Conference (2008).
3. "Throughput/Delay Measurements of Limited Feedback Beamforming in Indoor Wireless Networks," R. Daniels, K. Mandke, S. Nettles and R. W. Heath, Jr. Appears in Proc. of IEEE Global Telecommunications Conf., pp. 1-6, New Orleans, LA, USA, Nov. 30 - Dec. 4, 2008 (2008)
4. "Machine learning for physical layer link adaptation in multiple-antenna wireless networks," R. Daniels, K. Mandke, Steven W. Peters, S. Nettles and R. W. Heath, Jr. Appears in WiNTECH '08: Proceedings of the third ACM international workshop on Wireless network testbeds, experimental evaluation and characterization, (2008)
5. "A Software Architecture for Cross-Layer Wireless Network Adaptations," Soon-Hyeok Choi, Dewayne E. Perry, and Scott M. Nettles Appears in WICSA '08: Proceedings of the Seventh Working IEEE/IFIP Conference on Software Architecture (2008)
6. "Physical Concerns for Cross-Layer Prototyping and Wireless Network Experimentation," K. Mandke, R. Daniels, Soon-Hyeok Choi, S. Nettles and R. W. Heath, Jr., Appears in Proc. of the Second ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation and Characterization, pp. 11-18, Montreal, Canada, September 10, (2007).
7. "A MIMO Demonstration of Hydra," K. Mandke, R. Daniels, Soon-Hyeok Choi, S. Nettles and R. W. Heath, Jr. Appears in Proc. of the Second ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation and Characterization, pp. 101-102, Montreal, Canada, September 10, (2007).

8. "Early Results on Hydra: A Flexible MAC/PHY Multihop Testbed," K. Mandke, Soon-Hyeok Choi, Gibeom Kim, R. Grant, R. Daniels, Wonsoo Kim, R. W. Heath, Jr., and S. Nettles Appears in Proc. of IEEE Vehicular Tech. Conf. , pp. 1896-1900, Dublin, Ireland, April 23 - 25, (2007).
9. "Multichannel Feedback in OFDM Ad Hoc Networks," T. Tang, K.Mandke, C. B. Chae, R. W. Heath, Jr., and S. Nettles Appears in IEEE Sensor and Ad Hoc Communications and Networks (SECON), vol. 2, pp. 701-706, (2006).
10. "Authentication, Authorization, and Accounting for Real-Time Secondary Market Services," Yihong Zhou, Dapeng Wu, and Scott M. Nettles, Appears in the IEEE International Conference on Communications (ICC) May 2005.
11. "Balancing the Hidden and Exposed Node Problems With Power Control In CSMA/CA-Based Wireless Networks," Yihong Zhou and Scott M. Nettles, Appears in the IEEE Wireless Communications and Networking Conference 2005.
12. "Improving TCP throughput for multi-hop wireless networks using multiple antennas," Minyoung Park and Scott M. Nettles, Appears in the Vehicular Technology Conference, 2005.
13. "An overhead controlled MAC protocol for high data-rate wireless networks," Soon-Hyeok Choi and Scott M. Nettles, Appears in the Vehicular Technology Conference, 2005.
14. "A max-min strategy for QoS improvement in MIMO ad-hoc networks," Seung Jun Baek, Gibeom Kim, and Scott M. Nettles, Appears in the Vehicular Technology Conference, 2005.
15. "Analyzing and Preventing MAC-Layer Denial of Service Attacks for Stock 802.11 Systems," Yihong Zhou, Dapeng Wu, and Scott M. Nettles, Appears in Proc. of IEEE/ACM First International Workshop on Broadband Wireless Services and Applications.
16. "Improving Throughput and Fairness for MIMO Ad Hoc Networks Using Antenna Selection Diversity," Minyoung Park, Robert W. Heath, Jr. and Scott Nettles, Appears in in Proc. of IEEE Global Telecommunications Conf., Dallas, TX, USA on Nov. 29 - Dec. 3, 2004.
17. "A MIMO-OFDM Transceiver for Ad Hoc Networking," Taiwen Tang, Minyoung Park, Robert W. Heath, Jr., and Scott M. Nettles, Appears in Proc. of International Workshop on Wireless Ad-hoc Networks, Oulu, Finland on May 31 - Jun. 3, 2004.
18. "Wireless Channel-aware Ad Hoc Cross-Layer Protocol with Multi-route Path Selection Diversity," Minyoung Park, Jeffery G. Andrews and Scott Nettles, Appears in Proceedings of the IEEE Vehicular Technology Conference, October, 2003.
19. "Scalable Distributed Management with Lightweight Active Packets," Jonathan T. Moore, Jessica Kornblum Moore, and Scott Nettles, Appears in the Fourth International Working Conference on Active Networks (IWAN 2002).
20. "Experiences with Capsule-based Active Networking," Jonathan T. Moore, Michael Hicks, David Wetherall, and Scott Nettles. In *Proceedings of DARPA Active Networks Conference and Exposition, 2002*, San Francisco, June 2002.
21. "Dynamic Software Updating," Michael Hicks, Jonathan T. Moore, and Scott Nettles, *Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation*, pages 13-23. ACM, June 2001. (~20% acceptance rate)
22. "Practical Programmable Packets," Jonathan T. Moore, Michael Hicks, and Scott Nettles, *Proceedings of the Twentieth IEEE Computer and Communication Society (INFOCOM) Conference*, pages 41-50. IEEE, April 2001. (23% acceptance rate)

23. "Compiling PLAN to SNAP," Michael Hicks, Jonathan T. Moore, and Scott Nettles. *Proceedings of the Third International Working Conference on Active Networks*, Ian W. Marshall, Scott Nettles, and Naoki Wakamiya editors, volume 2207 of Lecture Notes in Computer Science, pages 134-151. Springer-Verlag, October 2001.
24. "Active Networking Means Evolution (or enhanced extensibility required)," Michael Hicks and Scott Nettles. *Proceedings of the Second International Working Conference on Active Networks*, Hiroshi Yashuda editor, volume 1942 of Lecture Notes in Computer Science, pages 16-32. Springer-Verlag, October 2000.
25. "PLANet: An Active Internetwork," Michael Hicks, Jonathan T. Moore, D. Scott Alexander, Carl A. Gunter, and Scott Nettles, *Proceedings of the Eighteenth IEEE Computer and Communication Society (INFOCOM) Conference*, pages 1124-1133. IEEE, March 1999. (32% acceptance rate)
26. "Sidney and RDS: An Evaluation of Two Persistent Storage Systems," Scott M. Nettles, *Proceedings of the IEEE International Performance, Computing, and Communications Conference*, Phoenix, February 1999.
27. "PLAN: A Packet Language for Active Networks," Michael Hicks, Pankaj Kakkar, Jonathan T. Moore, Carl A. Gunter, and Scott Nettles, *The ACM SIGPLAN International Conference on Functional Programming (ICFP)*, pages 86-93. Baltimore, September 1998. (~20% acceptance rate)
28. "Transactions for Java," Alex Garthwaite and Scott Nettles, *IEEE International Conference on Computer Languages*, pages 16-27, Chicago, May 1998. (30% acceptance rate)
29. "A Study of Large Object Spaces," Michael Hicks, Luke Hornoff, Jonathan T. Moore, and Scott Nettles, *Proceedings of the International Symposium on Memory Management (ISMM)*, pages 138-145, Vancouver, October 1998.
30. "The SwitchWare Active Network Implementation," D. Scott Alexander, Michael W. Hicks, Pankaj Kakkar, Angelos D. Keromytis, Marianne Shaw, Jonathan T. Moore, Carl A. Gunter, Trevor Jim, Scott M. Nettles, and Jonathan M. Smith, *Proceedings of the ACM SIGPLAN Workshop on ML*, Baltimore, September 1998.
31. "Transactions in a Flash," Morgan Price and Scott Nettles. In *Proceedings of the Eighth Workshop on Persistent Object Systems*, pages 2-16, September 1998.
32. "Network Programming with PLAN," Michael Hicks, Pankaj Kakkar, Jonathan T. Moore, Carl A. Gunter and Scott Nettles, in *Internet Programming Languages, ICCL'98 Workshop*, Henri E. Bal and Boumediene Belkhouche and Luca Cardelli editors, volume 1686 of Lecture Notes in Computer Science, pages 127-143. Springer-Verlag, May 1998.
33. "The Disk-Covering Method for Tree Reconstruction," D. Huson, S. Nettles, L. Parida, T. Warnow, and S. Yooseph, *Algorithms and Experiments (ALEX)*, 1998.
34. "Active Bridging," Scott Alexander, Marianne Shaw, Scott M. Nettles, and Jonathan M. Smith, In *Proceedings of SIGCOMM '97*, pages 101-111, September 1997. (11% acceptance rate)
35. "Infrastructure for proof-referencing code," C. Gunter, P. Homeier and S. Nettles, in *Proceedings, Workshop on Foundations of Secure Mobile Code*, March 1997.
36. "The Measured Cost of Copying Garbage Collection Mechanisms," Michael Hicks, Jonathan T. Moore, and Scott Nettles, In *Proceedings of the International Conference on Functional Programming (ICFP)*, pages 292-305, June 1997. (32% acceptance rate)

37. "Transactions for Java," Alex Garthwaite and Scott Nettles, in *Proceedings of the First Workshop on Java and Persistence*, September 1996.
38. "A Rollback Technique for Implementing Persistence by Reachability," Scott Nettles and James O'Toole, in *Proceedings of the Seventh Workshop on Persistent Object Systems*, pages 120-127, June 1996.
39. "Concurrent Replicating Garbage Collection," James W. O'Toole and Scott M. Nettles, In *Proceedings of the ACM Conference on Lisp and Functional Programming*, pages 34-42, June 1994. Also MIT-LCS-TR-570 and CMU-CS-93-138. (~20% acceptance rate)
40. "Concurrent Compacting Garbage Collection of a Persistent Heap," James W. O'Toole, Scott M. Nettles, and David K. Gifford, In *Proceedings of the 14th ACM Symposium on Operating Systems Principles*, pages 161-174, ACM, December 1993. (27% acceptance rate) Also CMU-CS-93-137 and MIT-LCS-TR-569.
41. "Real-Time Replication Garbage Collection," Scott M. Nettles and James W. O'Toole, In *Proceedings of the SIGPLAN Symposium on Programming Language Design and Implementation*, pages 217-226, ACM, June 1993. (17% acceptance rate)
42. "Improving the Performance of SML Garbage Collection using Application-Specific Virtual Memory Management," Eric Cooper, Scott Nettles, and Indira Subramanian, In *Proceedings of the ACM Conference on Lisp and Functional Programming*, pages 43-52, June 1992. (~20% acceptance rate)
43. "Replication-Based Incremental Copying Collection," Scott M. Nettles, James W. O'Toole, David Pierce, and Nicholas Haines, in *Proceedings of the SIGPLAN International Workshop on Memory Management*, Springer-Verlag, pages 357-364, September 1992. Also CMU-CS-93-135.
44. "Extensions to Standard ML to Support Transactions," Jeannette M. Wing, Manuel Faehnrich, J. Gregory Morrisett, and Scott M. Nettles, in *ACM SIGPLAN Workshop on ML and its Applications*, pages 104-118, June 1992. Also CMU-CS-92-132, April 1992.
45. "Persistence + Undoability = Transactions," Scott M. Nettles and Jeannette M. Wing, in *Proceedings of Hawaii International Conference on Systems Science 25*, January 1992. Also CMU-CS-91-173, August 1991.
46. "Reliable Distributed Computing with Avalon/Common Lisp," Stewart M. Clamen, Linda D. Leibengood, Scott M. Nettles, and Jeannette M. Wing, In *Proceedings of the 1990 International Conference on Computer Languages*, pages 169-179, New Orleans, March 1990. Also CMU-CS-89-186.

Technical Reports

1. "General-Purpose Persistence Using Flash Memory," Jonathan T. Moore, Michael Hicks, and Scott Nettles. Technical Report MS-CIS-97-3, CIS Department, University of Pennsylvania, 1997.
2. "Switchware: Accelerating Network Evolution," J. M. Smith, D. J. Farber, C. A. Gunter, S. M. Nettles, D. C. Feldmeier, and W. D. Sincoskie. Technical Report MS-CIS-96-38, CIS Department, University of Pennsylvania, 1996.
3. "Safe and Efficient Persistent Heaps," Scott Nettles. Technical Report CMU-CS-TR-95-225, Carnegie Mellon School of Computer Science, December 1995.
4. "Tinkertoy Transactions," Nicholas Haines, Darrell Kindred, J. Gregory Morrisett, Scott M. Nettles, and Jeannette M. Wing, Technical Report CMU-CS-93-202, Carnegie Mellon Computer Science Department, December 1993.

5. "Venari/ML Interfaces and Examples," Jeannette M. Wing, Manuel Faehndrich, Nicholas Haines, Karen Kietzke, Darrell Kindred, J. Gregory Morrisett and Scott M. Nettles, Technical Report CMU-CS-93-123, Carnegie Mellon Computer Science Department, March 1993.
6. "A Larch Specification of Copying Garbage Collection," Scott Nettles, Technical Report CMU-CS-92-219, Carnegie Mellon Computer Science Department, December 1992.

Invited Talks

1. "PLAN and PLANet," Brown University, Department of Computer Science, Spring 1999.
2. "Safe and Efficient Persistent Heaps," The University of Arizona, Department of Computer Science, December 1998.
3. "PLAN and PLANet," The University of Arizona, Department of Computer Science, Spring 1998.
4. "PLAN and PLANet," Indiana University, Department of Computer Science, Spring 1998.
5. "PLAN and PLANet," The University of Texas at Austin, Department of Computer Sciences, Spring 1998.
6. "PLAN and PLANet," Rutgers University, Department of Computer Science, Spring 1998.
7. "Replicating Collection and the Oscar Performance Evaluation Tool," Sun Microsystems Java Research Group, August 1997.
8. "Replicating Collection and the Oscar Performance Evaluation Tool," Intel Java Research Group, August 1997.
9. "Transactions For Java," Carnegie Mellon, August 1996.
10. "Safe and Efficient Persistent Heaps," INRIA, June 1996.
11. "Real-Time Replication Garbage Collection," Xerox Palo Alto Research Center, Palo Alto, California, June 1993.
12. "Real-Time Replication Garbage Collection," DEC Systems Research Center, Palo Alto, California, June 1993.
13. "Real-Time Replication Garbage Collection," Massachusetts Institute of Technology, Cambridge, Massachusetts, November 1992.
14. "Persistence + Undoability = Transactions," European Computer Research Center, Munich, Germany, September 1992.
15. "Distributed First-Class Values for Functional Languages," European Computer Research Center, Munich, Germany, September 1992.

Invited Participant

1. NSF Wireless Networking PI meeting, January 2004.
2. NSF Networking PI meeting, November 2000, January 2003.
3. DARPA Active Networks Next Generation Workshop, December 2001.
4. DARPA Active Networks PI Meeting, December 2001.
5. DARPA Focus 2000, June 2000.
6. DARPA Active Networks Demonstration, December 2000.

7. OOPSLA '97 Workshop on Memory Management and Garbage Collection, Atlanta GA, October 1997.
8. Third DARPA Workshop on Active Networks, June 1997.
9. DARPA Workshop on Foundations for Secure Mobile Code, March 1997.
10. Second DARPA Workshop on Active Networks, March 1997.
11. First DARPA Workshop on Active Networks, September 1996.
12. OOPSLA '93 Workshop on Memory Management and Garbage Collection, Washington, D.C., September 1993.

Software Distributions

1. The Active Bridge. <http://www.cis.upenn.edu/~switchware/activebridge/>
2. PLAN and PLANet. <http://www.cis.upenn.edu/~switchware/PLAN/software.html>
3. Oscar. <http://www.cis.upenn.edu/~oscar/oscar.tar.gz>
4. SNAP. <http://www.cis.upenn.edu/~switchware/SNAP/snap1.0.tar.gz>.
5. Hydra. <http://hydra.ece.utexas.edu/download/>

Consulting

May 2020 - Present

Type of Matter: Patent Infringement

Law Firms: Connor Kudlac Lee PLLC and Whitaker Chalk Swindle & Schwartz representing Pinn, Inc.

Case: Pinn, Inc., v Apple, Inc. (Case No. 8:19-cv-1805-DOC-JDE)

Services Provided: Retained as a testifying expert witness for plaintiff. Produced and was deposed on report concerning validity.

Disposition: Ongoing.

December 2018 - February 2020

Type of Matter: Patent Infringement

Firm: J. C. Penney Company, Inc.

Case: CXT Systems, Inc. v. J. C. Penney Company, Inc., No. 2:18-cv-00233 (E. D. Tex.) (Lead CXT Systems, Inc. v. Academy, Ltd., et al., No. 2:18-cv-171 (E.D. Tex.))

Services Provided: Retained as testifying expert witness on non-infringement. Produced a report and was deposed.

Disposition: Case settled.

July 2018 - January 2020

Type of Matter: Patent Infringement

Law Firm: Erise IP, P.A. representing Digital Ally, Inc.

Case: Digital Ally, Inc., v Enforcement Video, LLC d/b/a Watchguard Video (Case No. 2:16-cv-2349, D. Kan)

Services Provided: Retained as a testifying expert witness for plaintiff.

Disposition: Case settled.

July 2018 - Present

Type of Matter: Patent Infringement

Law Firm: Erise IP, P.A. representing Digital Ally, Inc.

Case: Digital Ally, Inc., v TASER International, Inc. (Case No. 2:16-cv-2032, D. Kan)

Services Provided: Retained as a testifying expert witness for plaintiff. Produced and was deposed on reports concerning infringement and validity.

Disposition: Ongoing.

May 2018 - Present

Type of Matter: Class Action

Law Firm: Pomerantz LLP representing Williams, et al.

Case: Williams, et al. v. Apple, Inc., United States District Court for the Eastern District of New York, Civil Action No. 15-cv-07381 (SJ) (LB).

Services Provided: Retained as a testifying expert witness for the plaintiffs. Produced and was deposed on reports concerning technical issues in the class certification phase.

Disposition: Ongoing.

January 2018 - February 2018

Type of Matter: Patent Infringement

Law Firm: Tensegrity Law Group LLP representing Arista Networks, Inc.

Case: Arista Networks, Inc. v. Cisco Systems, Inc. No. 5:16-CV-00923-BLF (N.D. Cal.)

Services Provided: Provided a declaration concerning the validity of my opinions from the Cisco/Arista ITC case listed below.

May 2017 - Present

Type of Matter: Patent Infringement

Law Firm: Mishcon de Reya New York LLP representing ChanBond, LLC

Cases: ChanBond, LLC v. Atlantic Broadband Group, LLC (15-CV- 842); ChanBond, LLC v. Bright House Networks, LLC (15-CV- 843); ChanBond, LLC v. Cable One, Inc. (15-CV- 844); ChanBond, LLC v. Cablevision Systems Corp. et al. (15-CV- 845); ChanBond, LLC v. Cequel Communications LLC et al. (15-CV- 846); ChanBond, LLC v. Charter Communications, Inc. (15-CV- 847); ChanBond, LLC v. Comcast Corp. et al. (15-CV- 848); ChanBond, LLC v. Cox Communications, Inc. (15-CV- 849); ChanBond, LLC v. Mediacom Communications Corp. (15-CV- 850); ChanBond, LLC v. RCN Telecom Services, LLC (15-CV- 851); ChanBond, LLC v. Time Warner, Inc. et al. (15-CV- 852); ChanBond, LLC v. WaveDivision Holdings, LLC (15-CV- 853); ChanBond, LLC v. WideOpenWest Finance, LLC (15-CV- 854); All in the United States District Court for Delaware

Services Provided: Retained as a testifying expert witness for plaintiff. Produced and was deposed on reports concerning infringement.

Disposition: In progress

February 2017 - November 2017

Type of Matter: Patent Infringement

Law Firm: Erise IP, P.A. representing Sandvine Corporation and Sandvine Incorporated ULC

Case: Packet Intelligence LLC v. Sandvine Corporation and Sandvine Incorporated ULC United States District Court for the Eastern District of Texas, Marshall Division. Civil Action No. 16-cv-147

Services Provided: Retained as a testifying expert witness for defendant. Produced and was deposed on reports concerning invalidity and non-infringement. Testified at trial on non-infringement.

Disposition: Jury found in favor of the defendant.

February 2017 - July 2017

Type of Matter: Inter Partes Review

Law Firm: Mishcon de Reya New York LLP representing Chanbond LLC

Case: Cisco Systems, Inc. v. Chanbond LLC, Patent Trial and Appeal Board - Cases IPR2016-01744

Services Provided: Retained as a testifying expert witness. Produced declarations in support of the patent owner in the above-mentioned matters. Deposed on declarations.

Disposition: The PTAB found for the petitioner, under appeal.

August 2016 - January 2017

Type of Matter: Inter Partes Review

Law Firm: Ascenda Law Group representing Chanbond LLC

Case: RPX Corp v. Chanbond LLC - Patent Trial and Appeal Board - Cases IPR2016-00234

Services Provided: Retained as a testifying expert witness. Produced declarations in support of the patent owner in the above-mentioned matters. Deposed on declarations.

Disposition: The PTAB found for the patent holder.

February 2016 - May 2016

Type of Matter: Inter Partes Review

Law Firm: Handal & Associates

Case: Google Inc., Nest Labs, Inc., and Dropcam, Inc., v. e.Digital Corporation Cases IPR2015-01470-01475

Services Provided: Retained as a testifying expert witness. Produced declarations in support of the patent owner in the above-mentioned matters. Case settled.

December 2015 - December 2017

Type of Matter: Patent Infringement

Law Firm: Cohen & Grace, LLC representing Innovative Memory Systems, Inc.,

Case: Innovative Memory Systems, Inc., v. Micron Technology, Inc., Case No. 1:14-Cv-01480-Rga

Services provided: Retained as a testifying expert witness. Produced declaration in support of related IPR (IPR: 2016-00330) and was deposed on declaration.

October 2015 - January 2016

Type of Matter: Inter Partes Review

Law Firm: Ascenda Law Group representing Certified Measurement, Inc.

Case: Itron, Inc, v. Certified Measurement, Inc. Case IPR2015-00570

Services Provided: Retained as a testifying expert witness. Produced a declaration in support of the patent owner in the above-mentioned matter. Deposed on declaration. Case settled.

September 2015 - Present

Type of Matter: Patent Infringement

Law Firm: Mishcon de Reya New York LLP representing Sycamore IP Holdings LLC

Case: Sycamore IP Holdings LLC v. AT&T Corp. et al., United States District Court for the Eastern District of Texas, Marshall Division. Civil Action No.2:16-cv-588-WCB

Services Provided: Retained as a testifying expert witness for plaintiff. Produced and was deposed on reports concerning infringement and validity.

Disposition: Trial pending claim construction appeal

March 2015 - Present

Type of Matter: Patent Infringement

Law Firm: Mishcon de Reya New York LLP followed by DiNovo Price LLP representing KlausTech, Inc.

Case: KlausTech, Inc., v. Google LLC United States District Court for the Northern District of California Case No. 4:10-cv- 05899-JSW

Services Provided: Retained as a testifying expert witness for plaintiff. Produced and was deposed on reports concerning infringement and validity.

Disposition: Trial pending

March 2015 - Present

Type of Matter: Inter Partes Review

Law Firm: Ascenda Law Group representing Clouding Corp

Case: EMC Corp v. Clouding Corp - Patent Trial and Appeal Board - Cases CBM2014-00116-0118

Services Provided: Retained as a testifying expert witness. Produced declarations in support of the patent owner in the above-mentioned matters. Deposed on declarations.

February 2015 - September 2015

Type of Matter: Patent Infringement

Law Firm: Fish & Richardson representing Arista Networks, Inc.

Case: Cisco Systems v. Arista Networks, Inc. U.S. International Trade Commission, Investigation 337-TA-944

Services Provided: Retained as a testifying expert witness for respondent. Produced expert reports on Invalidity and Noninfringement for two of the patents-in-suit. Was deposed on these

reports and prepared witness statements for trial. One patent dropped prehearing. Testified for ALJ Shaw on non-infringement and invalidity of the second. Finding of non-infringement.

February 2015 - June 2015

Type of Matter: Patent Infringement

Law Firm: Verrill Dana LLP representing Verisilicon, Inc.

Case: Uniloc USA, et al. v. Verisilicon, Inc. United States District Court for the Eastern District of Texas, Tyler Division. Civil Action No. 6:14-cv-486

Services Provided: Retained as a testifying expert witness for defendant Produced declaration on claim construction. Deposed on declaration. Testified at Markman hearing. Case settled before Markman ruling.

February 2015 - May 2015

Type of Matter: Injunction enforcement

Law Firm: Greenberg Traurig LLP representing Global Ground Automation, Inc.

Case: Global Ground Automation, Inc. v. ORISSA HOLDINGS, LLC, GROUND MANAGEMENT HOLDINGS, LLC, individually and dba GROUNDSPAN, and GROUNDWIDGETS-C.A. No. 6:15-cv-002-RWS-JDL

Services Provided: Retained as a testifying expert witness. Produced declaration in support of the patent owner in the above-mentioned matters. Deposed on declaration. Testified at hearing.

October 2014 - March 2015

Type of Matter: Covered Business Method Patent Review

Law Firm: The Elliott Law Firm, PLLC representing Return Mail, Inc.

Case: United States Postal Service v. Return Mail, Inc. - Patent Trial and Appeal Board - Case CBM2014-00116

Services Provided: Retained as a testifying expert witness. Produced a declaration in support of the patent owner in the above-mentioned matter.

April 2014 - July 2014

Type of Matter: Covered Business Method Patent Review

Law Firm: Rothwell, Figg, Ernst & Manbeck, P.C. representing Versata Development Group, Inc.

Case:

SAP America, Inc. and SAP AG v. Versata Development Group, Inc. US PTO - Patent Trial and Appeal Board - Case CBM2013-00042

Services Provided: Retained as a testifying expert witness. Produced a declaration in support of the patent owner in the above-mentioned matter.

January 2014 - July 2014

Type of Matter: Patent Infringement

Law Firm: Fisch Hoffman Sigler, LLP representing J.C. Penney Corporation, Inc.

Case: EMG Technology, LLC v. J.C. Penney Corporation, Inc. United States District Court for the Eastern District of Texas, Tyler Division. Civil Action No. 6:12-cv-00905

Services Provided: Retained as a testifying expert witness for defendant, J.C. Penney Corporation, Inc.. Produced an expert report on non-infringement.

Disposition: Case dismissed at EMG's request.

January 2014 - July 2014

Type of Matter: Patent Infringement

Law Firm: McAndrews Held & Malloy, Ltd. representing Walgreen Company

Cases: Walgreen Co. v. CVS Caremark Corp., United States District Court for the District of Delaware Civil Action No. 1:14-cv-00123-GMS and Walgreen Co. v. Rite Aid Corp., United States District Court for the District of Delaware Civil Action No. 1:14-cv-00124-GMS and Walgreen Co. v. Shopko Stores Operating Co. LLC, United States District Court for the District of Delaware Civil Action No. 1:14-cv-00125-GMS

Services Provided: Retained as a testifying expert witness in three closely related cases. Produced a declaration concerning infringement by each of the defendants.

Disposition: Case currently stayed.

December 2013 - April 2014

Type of Matter: Covered Business Method Patent Review

Law Firm: Haynes and Boone, LLP representing Versata Development Group, Inc.

Case: Volusion, Inc., v. Versata Development Group, Inc. US PTO - Patent Trial and Appeal Board - Cases CBM2013-00017 and CBM2013-00018

Services Provided: Retained as a testifying expert witness. Produced declarations in support of the patent owner in the above-mentioned matters. Deposed on declarations.

September 2013 - March 2014

Type of Matter: Patent Infringement

Law Firm: Taylor & Dunham, LLP representing Altium, Inc.

Case: Uniloc Luxembourg S.A., et al. v. Altair Engineering, Inc., et al. United States District Court for the Eastern District of Texas, Tyler Division. Civil Action No. 6:12-cv-806

Services Provided: Retained as a testifying expert witness for defendant, Altium. Produced declaration concerning claim construction issues.

Disposition: Client settled.

November 2012 - June 2016

Type of Matter: Patent Infringement

Law Firm: Taylor & Dunham, LLP representing Helios Software, LLC and Pearl Software, Inc.

Case: Helios Software, LLC and Pearl Software, Inc., v. Awareness Technologies, Inc., et al. United States District Court for the District of Delaware Civil Action No. 11-1259-LPS

Services Provided: Retained as a testifying expert witness. Produced expert reports on infringement, validity, and rebuttal of defendants expert report on non-infringement. Deposed on reports. Summary judgement finding for defendant.

November 2012 - June 2016

Type of Matter: Patent Infringement

Law Firm: Taylor & Dunham, LLP representing Helios Software, LLC and Pearl Software, Inc.

Case: Helios Software, LLC and Pearl Software, Inc., v. Spectorsoft Corporation, United States District Court for the District of Delaware Civil Action No. 12-081-LPS

Services Provided: Retained as a testifying expert witness. Produced expert reports on infringement, validity, and rebuttal of defendants expert report on non-infringement. Deposed on infringement and reply to defendant's expert report on non-infringement and on rebuttal of defendant's expert report on invalidity. Served as testifying expert at trial. Jury verdict for the defendant. Case settled prior to final judgement being entered.

October 2012 - December 2013

Type of Matter: Patent Infringement

Law Firm: Hosie Rice LLP representing Masterobjects, Inc.

Case: Masterobjects, Inc., v. eBay Inc., United States District Court for the Northern District of California Civil Action No. C 12-0680 (JSC)

Services Provided: Retained as a testifying expert witness. Produced expert report on infringement.

May 2012 - March 2013

Type of Matter: Patent Infringement

Law Firm: Hosie Rice LLP representing Implicit Networks, Inc.

Case: Implicit Networks, Inc., v. F5 Networks, Inc., United States District Court for the Northern District of California Civil Action No. C 10-3365 SI

Services Provided: Retained as a testifying expert witness. Produced report on infringement and validity. Was deposed on reports.

Disposition: Judge granted summary judgment of invalidity. Currently being appealed.

May 2012 - March 2013

Type of Matter: Patent Infringement

Law Firm: Hosie Rice LLP representing Implicit Networks, Inc.

Case: Implicit Networks, Inc., v. Juniper Networks, Inc. United States District Court for the Northern District of California Civil Action No. C 10-4234 SI

Services Provided: Retained as a testifying expert witness. Produced report on infringement and validity. Was deposed on reports.

Disposition: Judge granted summary judgment of invalidity. Currently being appealed.

November 2011 - August 2013

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing MOSAID Technologies Inc.

Case: MOSAID Technologies Inc. v. Dell, et al. United States District Court for the Eastern District of Texas, Marshall Division Civil Action No. 2:11-CV-179

Services Provided: Retained as a testifying expert witness.

Disposition: Case settled.

October 2011 - June 2013

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing Ericsson Inc.

Case: Ericsson Inc. et al., v. D-Link Corporation, et al. United States District Court for the Eastern District of Texas, Tyler Division Civil Action No. 6:10-cv-00473-LED

Services Provided: Retained as a testifying expert witness. Produced report on infringement and validity. Was deposed on reports. Testified on infringement and validity at trial.

Disposition: Jury found infringement of three patents and that patents were valid.

October 2011 - March 2013

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing VirnetX Inc.

Case: VirnetX Inc., v. Apple Inc. et al. United States District Court for the Eastern District of Texas, Tyler Division Civil Action No. 6:10-cv-417

Services Provided: Retained as a testifying expert witness. Produced report on infringement. Deposed on report. Testified on infringement at trial.

Disposition: Jury found non-infringement but that patents-in-suit were valid. Currently being appealed.

October 2011 - August 2013

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing VirnetX Inc.

Case: VirnetX Inc., v. Mitel Networks Corporation, et al. United States District Court for the Eastern District of Texas, Tyler Division Civil Action No. 6:11-cv-00018-LED

Services Provided: Retained as a testifying expert witness. Produced report on infringement. Deposed on report.

Disposition: Case settled.

August 2011 - March 2014

Type of Matter: Trade secret misappropriation

Law Firm: McGinnis, Lochridge & Kilgore, L.L.P. representing Versata.

Case: Versata Software, Inc., et al. v. Infosys Technologies Ltd., United States District Court for the Western District of Texas, Austin Division, Civil Action No. 1:10-cv-00792 SS

Services Provided: Retained as a testifying expert witness on trade secrets. Produced report, supplemental report, and second supplemental on trade secret misappropriation. Deposed on reports.

Disposition: Case settled.

May 2011 - February 2012

Type of Matter: Patent Infringement

Law Firm: Buether Joe & Carpenter, LLC representing J.C. Penney Company, Inc. Marshall, Gerstein & Borun LLP representing CDW, LLC.

Case: Eolas Technologies Incorporated, v. Adobe Systems Inc. et al., United States District Court for the Eastern District of Texas, Tyler Division, Civil Action No. 6:09-cv-446-LD. (Judge Davis)

Services Provided: Retained as a testifying expert witness on non-infringement. Produced report on non-infringement. Was deposed on report. Jury found patents invalid. Under appeal.

April 2011 - June 2012

Type of Matter: Patent Infringement

Law Firm: Jones Day representing Hypercom Corp. Kolisch Hartwell, P.C. representing Verifone. Morris, Manning & Martin LLP representing Ingenico.

Case: CardSoft, Inc., et al. v. Verifone Systems, Inc., et al. United States District Court for the Eastern District of Texas, Marshall Division, Civil Action No. 2:08-CV-00098-CE. (Judge Payne)

Services Provided: Retained as a testifying expert witness on non-infringement. Produced report on non-infringement. Deposed on report. Testified on non-infringement at trial.

Disposition: Jury found Hypercom and Verifone infringed and that Ingenico did not infringe. Currently being appealed.

December 2010 - March 2012

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing LML Patent Corp.

Case: LML Patent Corp. v. JP Morgan Chase & Co. et al. United States District Court for the Eastern District of Texas, Marshall Division Civil Action No. 2:08CV448(Df). (Judge Folsom)

Services Provided: Retained as a testifying expert witness on infringement. Produced two expert reports on infringement. Deposed on the first report February 2011. Deposed on both reports July 2011. Settled before trial.

August 2010 – June 2012

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing Versata Software, Inc., Versata Development Group, Inc., and Versata Industry Solutions, Inc. (Versata F/K/A Trilogy)

Case: Versata Software, Inc. et al. v. Internet Brands, Inc. f/k/a CarsDirect.com, Inc. et al. No. 2:08-CV-313 in the United States District Court for the Eastern District of Texas. (Judge Bryson)

Services Provided: Retained as a testifying expert witness. Produced report on infringement and validity as well as reverse engineering and trade secret issues. Was deposed on reports. Testified on infringement, validity, and trade secrets at trial.

Disposition: Jury found for the defendant on both patent and trade secret issues. Currently being appealed.

June 2010 - February 2011

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing i2 Technologies, Inc.

Case: i2 Technologies, Inc. et al. v. Oracle Corporation, et al. No. 6:09-CV-194-LED in the U.S. District Court – Eastern District of Texas – Tyler Division. (Judge Davis)

Services Provided: Retained as a testifying expert witness on invalidity and non-infringement. Produced report on the invalidity of the patent in suit and a rebuttal report to Oracles's experts report on infringement. Deposed February 2011. Settled before trial.

December 2009 – October 2010

Type of Matter: Patent Infringement

Law Firm: Akin Gump Strauss Hauer & Feld LLP representing Hyundai Motor America, Inc., Hyundai Motor Manufacturing Alabama LLC, and Kia Motors America, Inc.

Case: Affinity Labs of Texas, LLC v. BMW North America, LLC et al. C.A. No. 9:08-cv-00164-RC in the United States District Court for the Eastern District of Texas (Lufkin.) (Judge Clark)

Services Provided: Retained as a testifying expert witness on non-infringement of the Hyundai entities products. Advised client concerning claim construction and testified informally at claim construction hearing. Produced a report on non-infringement and was deposed on said report. Testified on non-infringement at trial.

Disposition: Jury found the patents valid and infringed. Jury awarded Affinity Labs \$2.8 Million in damages. Currently being appealed.

October 2007 – March 2010

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing Versata Software, Inc., Versata Development Group, Inc., and Versata Industry Solutions, Inc. (Versata F/K/A Trilogy)

Case: Versata Software, Inc., Versata Development Group, Inc., Versata Industry Solutions, Inc., v. SAP America, Inc., SAP, AG, C.A. No. 2:07-CV-153-CE in the United States District Court for the Eastern District of Texas. (Judge Everingham)

Services Provided: Retained as a testifying expert witness. Did extensive source code and other analysis. Produced reports on infringement and validity as well as several supplemental reports, produced various declarations, was deposed concerning claim construction, both expert reports, and late discovery. Testified as sole technical expert during trial. Testified at inequitable conduct hearing.

Disposition: Jury found the patents valid and infringed. Jury awarded Versata \$138.6 Million in damages. A subsequent trial resulted in a new damages award of \$391 Million. SAP's appeal was not granted.

October 2007 – April 2009

Type of Matter: Patent Infringement

Law Firm: McKool Smith representing Versata Software, Inc. and Versata Development Group, Inc.

Case: Versata Software, Inc., Versata Development Group, Inc., v. Sun Microsystems Inc. , C.A. No. 2:06-CV-358-TJW in the United States District Court for the Eastern District of Texas. (Judge Ward)

Services Provided: Retained as a testifying expert witness. Did extensive source code and other analysis. Produced reports on infringement and validity as well as several supplemental reports, produced various declarations, was deposed concerning claim construction and both expert reports. Testified as sole technical expert during trial.

Disposition: Jury found there was no infringement and invalidated the patents. Settled during appeal.

March 2007 – July 2007

Type of Matter: Patent Infringement

Law Firm: Slusser Wilson & Partridge, LLP representing Hybrid Patents Incorporated

Case: Hybrid Patents Incorporated v. Charter Communications, Inc., C.A. No. 2:05-CV-436-TJW in the United States District Court for the Eastern District of Texas. (Judge Ward)

Services Provided: Retained as an expert witness. Produced reports on infringement and validity as well as a supplemental report, produced various declarations, was deposed concerning both reports, and testified during the trial as the sole technical expert.

Disposition: Jury found there was no infringement but did not invalidate the patents. Settled during appeal.